Financing nature-based solutions

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What are nature-based solutions (NBS)?

NBS are “living solutions inspired by, continuously supported by and using nature, which are designed to address various societal challenges in a resource-efficient and adaptable manner and to provide simultaneously economic, social, and environmental benefits”.

Flickr: Randi Hausken
Examples of NBS

Green wall, Mexico

Rainbed in street, Norway

Urban tree planter

Isabel Seifert-Dähnn / NIVA

Tareskog, Norway

Janne K. Gitmark/ NIVA

http://www.ladstudios.com/LADsites/Sustainability/Strategies/Strategies_TreeWell.shtml
Why NBS?

NBS provide **multiple-benefits** and solution to address societal challenges:

- climate change
- food security
- water security
- disaster risk reduction
- human health
- social and economic development

IUCN (2016)
Example: Stormwater
From a problem to a resource

«Wrong» Urbanisation + climate change = more stormwater

Copenhagen monster-rain in 2011 – 150 mm in 2 hours
= 150 liter water per m2 in 2 hours

Stormwater management by NBS requires «shared (spatial) responsibility» - we have to take the citizens on board!
Relevance of NBS on the urban agenda
Challenges

Relatively “slow” uptake of NBS

Table 6. Barriers to successful development and uptake of NBS.

<table>
<thead>
<tr>
<th>Barriers</th>
<th>Number of Papers</th>
<th>References</th>
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</thead>
<tbody>
<tr>
<td>Inadequate financial resources *</td>
<td>9</td>
<td>[22,24,27,31,32,34,36,39,40]</td>
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<tr>
<td>Path dependency *</td>
<td>7</td>
<td>[8,17,31,40,43,45,50]</td>
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<td>Institutional fragmentation *</td>
<td>6</td>
<td>[8,22,31,34,50,52]</td>
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<tr>
<td>Inadequate regulations *</td>
<td>6</td>
<td>[17,20,22,36,40,52]</td>
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<tr>
<td>Uncertainty regarding implementation process and</td>
<td>18</td>
<td>[8,9,12,13,15–18,20,22–25,27,28,31,32,35,37,39–41,52]</td>
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<td>effectiveness of the solutions ***</td>
<td></td>
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<td>Limited land and time availability **</td>
<td>7</td>
<td>[12,23,27,31,36,37,52]</td>
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Sarabi et al (2019)
Questions

(1) What are business models for NBS or how can NBS be used in existing business model?

(2) How are NBS currently financed and what future financing solutions are proposed?
Potential financing mechanisms for NBS

Implement/maintain public NBS projects:
• Innovative use of public budgets (i.e. cross-agency)
• Grant funding and donations
• Instruments generating revenue (including value-capture mechanisms)
• ‘Green finance’ (or debt-based instruments)
Potential financing mechanisms for NBS

Encourage **third actors** to implement/maintain **public & private** NBS projects:

• Market-based instruments
• Developing ‘Business Improvement Districts’
• Setting up endowments
• Creating Public-Private Partnerships
• Revolving funds
• Community asset transfers
• Regulation and planning standards
• Leveraging existing regulatory obligations
Many suggestions – but what happens actually?

Zimmermann et al (2019)
400 green infrastructure projects in the US

N = 102
Many suggestions – but what happens actually?

Zimmermann et al (2019)

N = 74
Many suggestions – but what happens actually?

Almassy et al (2018), Survey in **94 European cities**, 976 NBS projects have been reported
Results from Almassy et al (2018)

Why so little private funding?
Business models for NBS

Value proposition: (1) What products or services are proposed, (2) what are the environmental, social and economic values they are supposed to deliver and (3) who are the beneficiaries of these products and services?

Value creation and delivery: (1) What actions are needed and what resources are required to deliver the proposed value and (2) what are key partners to deliver them?

Value capture: (1) What are the investment and operation costs for the NBS, (2) what are potential revenue streams and how can they be captured?
Example: Green roof

- Well-known technology
- Values for building owner
  → Quantifiable
  → Easy to capture
  → return on investment from day one

Business models for parks, forests, wetlands, green-blue infrastructure?

Challenges:

• Uncertainty in **value creation**
• **Time-gap** between NBS implementation and expected revenues
• **Scale** dependency of benefits
• **Value capture** is difficult → Many benefits have the character of **public** (non-excludable, non-rival) and **common** (non-excludable, non-rival) **goods**
Scale dependency: area covered / amount

Hutchins et al (forthcoming)
Scale dependency: distance

Hutchins et al (forthcoming)
Example: Air quality

Jones et al (2019)
Example: Air quality

Health benefit is largest where you have most beneficiaries

Should people in «clean air» areas pay for NBS in «cleaning areas»?

Jones et al (2019)
Preliminary conclusions

• We must get better in quantifying the multiple benefits of NBS
• Multiple actors have to be involved in design, implementation and financing of NBS
• More studies are needed on how NBS are currently financed
• Encourage «testing» of new financing mechanisms?
• Is it too early to make potential investors interested?